



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/051,867

01/15/2002

Ewald Guenther

12406-048001/P2002,0473US

1665

26181

7590

07/26/2004

FISH & RICHARDSON P.C.
3300 DAIN RAUSCHER PLAZA
MINNEAPOLIS, MN 55402

EXAMINER

DOLAN, JENNIFER M

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/051,867

Applicant(s)

GUENTHER ET AL.

Examiner

Jennifer M. Dolan

Art Unit

2813

aw

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 30 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-29 and 31 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 14.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This action is in response to the RCE filed 6/25/04

Claim Objections

1. Claim 31 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 31 depends upon itself, and thus fails to further limit the subject matter of a previous claim. For the purposes of examination, it is assumed that claim 31 depends upon claim 30.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 3, 7, 24, 25, 28, and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,639,249 to Valliath.

Regarding claims 1, 24, 25, and 28, Valliath discloses a device comprising: a first substrate (163, substrate of panel 608); a first plurality of active components (614) on the first

Art Unit: 2813

substrate, emitting light of a first wavelength (column 30, lines 6-7); a second substrate (163 of panel 606) mounted on the first substrate (figures 54, 55); a second plurality of active components (612) mounted on the second substrate, emitting light of a second wavelength (column 30, lines 6-7), wherein the first and second plurality of active components are arranged in a non-overlapping pattern (figures 54, 55; column 29, lines 24-30) to allow non-overlapping vertical optical paths for the light emitted from the active components (column 29, lines 24-30; figures 54, 55). Regarding claims 24 and 28, Valliath further teaches that the active components of each substrate emit light of a single given color through the stacked structure towards a viewing surface (figures 54, 55; column 29, line 64 – column 30, line 8).

Regarding claims 3 and 29, Valliath discloses that the plurality of substrates includes three substrates (figures 54, 55), and that each substrate is made of glass or quartz (column 29, line 45), which is transparent.

Regarding claim 7, Valliath discloses that the active components are distributed on a surface of each substrate (figures 54, 55).

4. Claims 1, 4, 5, 7, 24, 25, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,730,937 to Dai et al.

Regarding claims 1, 24, 25, and 28, Dai discloses a device comprising: a first substrate (101); a plurality of active components (103-105; also see figure 7) on the first substrate, emitting light of a first wavelength (column 3, lines 15-20); a second substrate (401; figure 4) mounted on the first substrate; a second plurality of active components on the second substrate (501, etc. figure 5) emitting light of a second wavelength (column 3, lines 43-55), wherein the

Art Unit: 2813

plurality of active components are arranged in a non-overlapping pattern to allow non-overlapping vertical optical paths (column 3, lines 55-60; figures 5 and 6). Regarding claims 24 and 28, Dai further discloses that the active components of each substrate emit light of a single given wavelength (column 4, lines 25-30) through the stacked structure (column 3, lines 58-60; figures 5 and 6).

Regarding claim 4, Dai discloses that the active components emitting light with the shortest wavelength (blue, corresponding to 501; figure 5) are mounted closest to the viewing surface (figure 5; viewing surface must be above LEDs, so that the thick substrate 101 does not absorb the emissions of each LED).

Regarding claims 5 and 7, Dai discloses that the active components are distributed on a surface of each substrate (figures 6 and 7).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3-5, 7, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,583,350 to Norman et al. in view of Valliath

Regarding claims 1 and 25, Norman discloses a device comprising: a plurality of substrates (first substrate 311 and second substrate 322) mounted vertically in a stacked structure (figure 1); and active components (312, 316, and 319 on the first substrate, emitting blue light,

Art Unit: 2813

and 313, 317, and 323 on the second substrate, emitting red light) arranged on each substrate, the active components of each substrate emitting light of a given wavelength through a stacked structure toward a viewing surface (figure 1), wherein the diodes are arranged in an essentially non-overlapping pattern to allow non-overlapping vertical optical paths for the light emitted from the active components of different substrates (figure 1; column 2, lines 23-30).

Norman does, however, disclose a slight overlap between the diodes on the first substrate and the diodes on the second substrate (column 2, lines 60-66). It is not clear whether the active components of the diodes are overlapping.

Valliath discloses a multi-substrate LED structure in which the LEDs are horizontally offset, such that they do not overlap (column 29, lines 24-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the diode placement of Norman such that the active components are non-overlapping, as taught by Valliath. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to provide a non-overlapping active/light emitting area pattern in order to allow the red LEDs (Norman, 313, 317, 323) to emit light unimpeded and unblocked by the intervening active components (see Norman, column 2, lines 60-63, lines 23-28; Valliath, column 29, lines 24-35).

Regarding claim 3, Norman discloses that the substrate is glass or plastic (column 2, lines 8-10).

Regarding claim 24, Norman discloses that the active components of different substrates emit different wavelengths of light (column 2, lines 12-18; lines 50-54).

Regarding claim 4, Norman discloses that the active components emitting the shortest wavelength light (312, 316, 319) are placed closest to the viewing surface (figure 1).

Regarding claims 5 and 7, Norman discloses that the active components are distributed on a surface of each substrate (figure 1).

7. Claims 8-10 and 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norman et al. in view of Valliath, as applied to claim 7, supra, and further in view of U.S. Patent No. 6,329,085 to Burrows et al.

Regarding claim 8, Norman discloses that the active components on one of the substrates comprise one or more organic layers sandwiched between first and second conductive layers, forming an organic light emitting diode (column 2, lines 30-46).

Norman fails to disclose that the active components on the second substrate comprise organic layers sandwiched between first and second conductive layers.

Burrows discloses a red OLED using organic layers sandwiched between conductive layers (column 6, lines 14-24; column 15, lines 15 –63; column 16, lines 32-50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the second substrate of Norman as modified by Valliath, such that it includes red OLEDs, rather than non-organic LEDs, as taught by Burrows. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to use a red OLED, because Norman suggests that at the time of the '350 patent, red organic LEDs did not produce red emissions having a wavelength of 650 nm, such that proper full color displays could not be achieved (Norman, column 1, lines 17-26). Burrows later

Art Unit: 2813

teaches that red OLEDs having a wavelength of 650 nm (Burrows, figure 15) are possible, and lead to a more highly saturated red emission, as well as enhanced display brightness than had been previously possible (Burrows, column 6, lines 14-25). Thus, one skilled in the art would have substituted the OLED taught by Burrows into the display of Norman as modified by Valliath, in order to achieve the higher brightness and improved saturation.

Regarding claims 9 and 10, and 14-17, Norman as modified in claim 1, *supra*, discloses that the active components, which include the organic layers and first conductive layers, comprise a non-overlapping pattern, the pattern comprising strips (figures 1-3).

Regarding claims 12 and 13, Norman discloses that the conductive layer is magnesium-silver or lithium-silver (column 2, lines 44-46), both of which are opaque and comprise a metallic material.

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norman et al. in view of Valliath, as applied to claim 1, *supra*, and further in view of U.S. Patent Application Publication No. 2002/0135296 to Aziz et al.

Norman is silent as to the thickness of the substrate.

Aziz discloses a light-emitting device with a transparent substrate (paragraph 0071) having a thickness of 0.1 to 1 mm (paragraph 0072), which encompasses the range claimed in the present application.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the substrate of Norman as modified by Valliath has a thickness of less than 0.5 mm, as suggested by Aziz. The rationale is as follows: One of ordinary skill in the art

Art Unit: 2813

at the time the invention was made would have been motivated to provide a substrate of less than 0.5 mm, because thicknesses in that range are considered suitable for light emitting device applications (Aziz, paragraph 0072), and the selection of a particular thickness is a matter of routine optimization of the substrate thickness based on the structural demands of the device (Aziz, paragraph 0072). Although neither Norman nor Aziz specify that the substrate must be less than 0.5 mm thick, it has been held that “where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (1955).

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norman et al. in view of Valliath and Burrows et al, as applied to claim 8, above, and further in view of Aziz et al.

Norman is silent as to the thickness of the first and second conductive layers.

Aziz discloses thicknesses of the first (12,22,32, and 42) conductive layer of 0.001-5 microns, with a preferred range of 0.03 – 0.3 microns (paragraph 0075); and thicknesses of the second (18, 28, 38, and 48) conductive layer of 0.01 – 0.5 nm (paragraph 0099), which intersect the ranges claimed in the present application.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the conductive layers of Norman as modified by Valliath and Burrows, have thicknesses of about 0.02 – 1 micron, as taught by Aziz. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to specify thicknesses of about 0.02-1 micron, because such thicknesses are suitable and preferred

Art Unit: 2813

for light emitting device structures similar to that of Norman and of the present application (Aziz, paragraphs 0075 and 0099). Although the exact range of 0.02-1.0 microns was not disclosed by Norman or Aziz, it has been held that “where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (1955).

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norman et al. in view of Valliath, as applied to claim 1, supra, and further in view of U.S. Patent No. 6,211,538 to Park.

Norman fails to disclose that the active components are distributed on a first surface and a second surface of each substrate.

Park discloses that the active components (430 and 450) are distributed on a first surface and a second surface of the substrate (410; figure 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device structure of Norman as modified by Valliath, such that active components are distributed on first and second surfaces of the substrate, as taught by Park. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to distribute active components on both sides of the substrate, in order to further separate the light emitting elements, so that the electrodes don't short each other and so that the light paths don't interfere. Additionally, it's advantageous to dispose the layered structures for each light emitting element on a planar substrate surface than it is to deposit one element on top of the other element, because layer deposition or growth on top of an uneven or

Art Unit: 2813

already processed layer tends to lead to defects in crystallinity and growth, as is appreciated by one skilled in the art. Because Park shows that structures wherein active components are distributed solely on one side of a substrate (Park, figures 1 and 2), and structures wherein active components are distributed on two surfaces of a substrate (Park, figures 3 and 4) are essentially equivalent and can be used interchangeably, it is well within the purview of a person having ordinary skill in the art to select an arrangement with active components distributed on both surfaces of the substrate for the advantages listed supra.

11. Claims 19-23, 26, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norman et al. in view of Valliath and Park, as applied to claim 18, supra, and further in view of Burrows et al.

Regarding claim 19, Norman discloses that the active components on one of the substrates comprise one or more organic layers sandwiched between first and second conductive layers, forming an organic light emitting diode (column 2, lines 30-46).

Norman fails to disclose that the active components on the second substrate comprise organic layers sandwiched between first and second conductive layers.

Burrows discloses a red OLED using organic layers sandwiched between conductive layers (column 6, lines 14-24; column 15, lines 15 –63; column 16, lines 32-50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the second substrate of Norman as modified by Park, such that it includes red OLEDs, rather than non-organic LEDs, as taught by Burrows. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to

Art Unit: 2813

use a red OLED, because Norman suggests that at the time of the '350 patent, red organic LEDs did not produce red emissions having a wavelength of 650 nm, such that proper full color displays could not be achieved (Norman, column 1, lines 17-26). Burrows later teaches that red OLEDs having a wavelength of 650 nm (Burrows, figure 15) are possible, and lead to a more highly saturated red emission, as well as enhanced display brightness than had been previously possible (Burrows, column 6, lines 14-25). Thus, one skilled in the art would have substituted the OLED taught by Burrows into the display of Norman, in order to achieve the higher brightness and improved saturation.

Regarding claims 20, 22, and 23, Norman as modified in claim 19, supra, and as modified by Valliath in claim 1, supra, discloses that the active components, which include the organic layers and first conductive layers, comprise a non-overlapping pattern (Norman, figures 1-3; Valliath, figures 54 and 55).

Regarding claim 21, Norman discloses that the conductive layer is magnesium-silver or lithium-silver (column 2, lines 44-46), both of which are opaque.

Regarding claims 26 and 27, Norman as modified in claim 19, supra, and as modified by Valliath in claim 1, supra, discloses that the active components, which include the organic layers and first conductive layers, comprise a non-overlapping pattern (Norman, figures 1-3; Valliath, figures 54 and 55).

Norman fails to disclose that the devices on the first substrate emit through the first substrate, and the devices on the second surface emit away from the first substrate.

Art Unit: 2813

Park discloses that when components are distributed on both sides of a substrate, then one set of components (for example, 312 in figure 3) will emit through the substrate, and the other set of components (326, 325) will emit away from the substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the light emitting device structure of Norman as modified by Valliath, Park, and Burrows, by arranging the diode devices such that the ones on the first surface emit through the substrate, and the diode devices on the second surface emit away from the substrate, as further suggested by Park. The rationale is as follows: A person having ordinary skill in the art would have been motivated to provide diode devices emitting in such a manner, because in order for the device to function properly as a display, all of the diode elements need to emit in the same direction, as is appreciated by a person having ordinary skill in the art. Since diode devices are to be provided on both surfaces of a transparent substrate from claim 18, it is then necessary and obvious that such components must emit in the same direction, or in other words, the components must emit through the substrate when provided “below” the substrate, and away from the substrate when provided above (see Park, figures 3 and 4).

Allowable Subject Matter

12. Claim 30 is allowed.
13. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 2813

14. The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for allowability of claim 6 is that although the prior art suggests puncturing the stacked layers placed upon the substrate (see Valliath, column 29, lines 30-35) to facilitate light transmission, or staggering the substrates (see U.S. Patent No. 5,739,552 to Kimura), there is no suggestion in the prior art of puncturing the substrate or of arranging punctured and staggered substrates to bring the emitting levels of active components to similar heights. It is the examiner's opinion that a person having ordinary skill in the art would find no motivation or means for puncturing and staggering the substrates to bring the emitting components to similar heights. Likewise, for claim 30, although it is known in the art that diode components can emit through a transparent substrate (see Kimura, Norman, Valliath, Park), there is no particular teaching or motivation for disposing all of the substrates and diodes such that the diode emits through the substrate on which it is disposed towards a viewing surface. Although a person skilled in the art might realize that such an arrangement would be possible, it is the examiner's opinion that a person having ordinary skill in the art would select an arrangement in which all diodes emitted away from their respective substrates, or where only the diodes on the top-most substrate emitted through their substrate, as is suggested by the prior art.

Response to Arguments

15. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Dolan
Examiner
Art Unit 2813

jmd


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800